

The Fishes of Lake Okeechobee, Florida

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WITH the exception of descriptions and ranges of the freshwater fishes of Florida (Carr and Goin, 1959 and Briggs, 1958), fishery surveys of individual bodies of water or watershed areas of peninsular Florida (Bailey, Winn, and Smith, 1954; Hellier, 1967; Hearld and Strickland, 1949; Kilby and Caldwell, 1955; Hubbs and Allen, 1943) have not been sufficient to document accurate range limits of many peninsular Florida species.

This survey of Lake Okeechobee was initiated in an attempt to determine the composition and relative abundance of the fishes since southern range limits of a number of species were poorly documented and since exotic species are flourishing in some peninsular Florida freshwater. Peninsular Florida has a depauperate freshwater fish fauna with such dominant families as Cyprinidae, Catostomidae, and Percidae being represented by 5, 1, and 1 species respectively. On the other hand, the Centrarchidae and Cyprinodontidae are unusually well represented in the freshwaters of peninsular Florida, a result of the uniformly low gradient streams, the past geologic history, and the character of the water (Odum, 1953).

METHOD OF COLLECTION

The survey began in October, 1967, and continued through November, 1969. Collecting was accomplished with trammel nets, seines, a trawl, a 230-volt electrical shocker, and rotenone. Most fish were identified immediately upon collection. Those which could not be identified in the field were preserved in formalin and taken to laboratory facilities for identification with the works of Eddy (1957), Carr and Goin (1959), and Sterba (1966). Rarer specimens were kept while the more common specimens were discarded after identification. Habitat type was noted with the collection of each species.

RESULTS AND DISCUSSION

Forty-three species of fish were collected from Lake Okeechobee during the survey. Of these, 36 are freshwater fishes (Table 1), whereas seven are saltwater forms that invade adjacent freshwater

TABLE 1

Freshwater fishes collected from Lake Okeechobee, Florida

Family Amiidae	Family Cyprinodontidae
<i>Amia calva</i>	<i>Jordanella floridae</i>
Family Lepisosteidae	<i>Cyprinodon variegatus</i>
<i>Lepisosteus platyrhincus</i>	<i>Luciana goodei</i>
<i>Lepisosteus osseus</i>	<i>Fundulus seminolis</i>
Family Clupeidae	<i>Fundulus chrysotus</i>
<i>Dorosoma cepedianum</i>	Family Poeciliidae
<i>Dorosoma petenense</i>	<i>Poecilia latipinna</i>
Family Esocidae	<i>Gambusia affinis</i>
<i>Esox niger</i>	<i>Heterandria formosa</i>
<i>Esox americanus</i>	Family Atherinidae
Family Catostomidae	<i>Menidia beryllina</i>
<i>Erimyzon sucetta</i>	<i>Labidesthes sicculus</i>
Family Cyprinidae	Family Centrarchidae
<i>Notemigonus crysoleucas</i>	<i>Micropterus salmoides</i>
<i>Notropis maculatus</i>	<i>Pomoxis nigromaculatus</i>
<i>Opsopocodus emiliae</i>	<i>Enneacanthus gloriosus</i>
Family Ictaluridae	<i>Chaenobryttus gulosus</i>
<i>Ictalurus punctatus</i>	<i>Lepomis marginatus</i>
<i>Ictalurus catus</i>	<i>Lepomis punctatus</i>
<i>Ictalurus natalis</i>	<i>Lepomis macrochirus</i>
<i>Ictalurus nebulosus</i>	<i>Lepomis microlophus</i>
<i>Noturus gyrinus</i>	Family Percidae
Family Anguillidae	<i>Etheostoma barratti</i>
<i>Anguilla rostrata</i>	

areas (Table 2). Although no reproduction of these saltwater species occurs, with the possible exception of the Atlantic needlefish, significant immigration of some saltwater species yields large numbers of their kind, even to the point of their being common. Table 3 lists several species of fishes not found during this study but collected by other investigators (Florida Game and Fresh Water Fish Commission, 1956, Recommended program for northwest shore of Lake Okeechobee, unpublished report).

FAMILY AMIIDAE

1. *Amia calva* Linnaeus. Bowfin. This species is relatively abundant throughout the vegetated areas and the canal systems associated with the lake. Young individuals with the adult male were collected on January 29, suggesting an early spring spawning time.

TABLE 2
Salt water fishes collected from Lake Okeechobee

Family Belontiidae	<i>Strongylura marina.</i> Atlantic Needlefish
Family Mugilidae	<i>Mugil cephalus.</i> Striped Mullet
Family Gobiidae	<i>Microgobius gulosus.</i> Clown Goby
Family Soleidae	<i>Irinectes maculatus.</i> Hogchoker
Family Centropomidae	<i>Centropomus undecimalis.</i> Snook
Family Elopidae	<i>Elops saurus.</i> Ladyfish
	<i>Megalops atlantica.</i> Tarpon

FAMILY LEPISOSTEIDAE

2. *Lepisosteus platyrhincus* DeKay. Florida Gar. This species was collected from every major habitat within Lake Okeechobee. No individuals less than eight inches total length were collected. Greater numbers of these smaller individuals were collected during April and May as opposed to other months of the year.

3. *Lepisosteus osseus* (Linnaeus). Longnose Gar. Only one individual was collected during the study. It was captured in the open area of the lake.

FAMILY CLUPEIDAE

5. *Dorosoma cepedianum* (LeSueur). Gizzard Shad. This species was plentiful in the open area of the lake and was fre-

TABLE 3
Fishes reported from Lake Okeechobee by other investigators

Family Engraulidae	<i>Anchoa sp.</i> Anchovy
Family Cyprinidae	<i>Notropis chalybaeus.</i> Ironcolor Shiner
	<i>Notropis petersoni.</i> Coastal Shiner
Family Aphredoderidae	<i>Aphredoderus sayanus.</i> Pirate Perch
Family Centrarchidae	<i>Elassoma evergladei.</i> Everglades Pigmy Sunfish

quently collected within vegetated areas and canals. Spawning probably occurs from late spring to early fall.

5. *Dorosoma petenense* (Günther). Threadfin Shad. Like the gizzard shad, this species was abundant throughout the open area and frequently collected within the vegetated areas and canals. Spawning evidently takes place during the early fall.

FAMILY ESOCIDAE

6. *Esox niger* LeSueur. Chain Pickerel. This species was not frequently collected within any habitat, but was found on several occasions in association with pondweed, *Potamogeton*. Young individuals were collected during April suggesting that these fish are early spring spawners.

7. *Esox americanus* Gmelin. Redfin Pickerel. This species was relatively abundant within the marginal areas of the lake marsh during April and May, being associated with spikerush, *Eleocharis obtusa*, communities. Few individuals could be found during October and November.

FAMILY CATOSTOMIDAE

8. *Erimyzon sucetta* (Lacépède). Lake Chubsucker. Though abundant, this species occurred most frequently within vegetated areas of the lake where turbidity was extremely low. From the collection of young individuals, spawning must occur in early spring.

FAMILY CYPRINIDAE

9. *Notemigonus crysoleucas* (Mitchill). Golden Shiner. This species was collected from all areas of the littoral zone of the lake as well as from the canal systems. However, the golden shiner seems to prefer areas with a significant cover of water hyacinths, *Eichhornia crassipes*.

10. *Notropis maculatus* (Hay). Taillight Shiner. Through many individuals were collected in association with pondweed and bulrush, *Soirpus validus*, during the early spring, few specimens could be found during the fall.

11. *Opsopoeodus emiliae* Hay. Pugnose Minnow. This species seems to occupy the same areas as the taillight shiner, but is abundant during the fall months when the taillight shiner is scarce.

FAMILY ICTALURIDAE

12. *Ictalurus punctatus* (Rafinesque). Channel Catfish. A much sought after species by commercial fishermen, this species occurs primarily in open water, but during the spring months can be found in abundance within the vegetated littoral zone. Large numbers of 4-5 inch individuals found in the open area during June and July suggest that spawning takes place in the early spring.

13. *Ictalurus catus* (Linnaeus). White Catfish. This catfish is as abundant as the channel catfish and is found in the same areas, but less frequently within the littoral zone. Spawning takes place during the late spring.

14. *Ictalurus natalis* (LeSueur). Yellow Bullhead. This rather scarce species was collected from all areas of the lake but occurred most frequently in the canal systems of the lake.

15. *Ictalurus nebulosus* (LeSueur). Brown Bullhead. A rather abundant species, this catfish was collected within areas of dense vegetation (such as eelgrass, *Vallisneria americana*, and pondweed) where there was an amount of decaying organic material covering the bottom substrate. Young of the year collected as early as Thanksgiving Day suggest that spawning takes place during the winter months.

16. *Noturus gyrinus* (Mitchill). Tadpole Madtom. This scarce catfish was collected primarily from the open area of the lake. This species seems to be more abundant during the fall months.

FAMILY ANGUILLIDAE

17. *Anguilla rostrata* (LeSueur). American Eel. This catadromous species is frequently encountered in the open area of the lake, but at no time is abundant enough to be commercially important. Its numbers do not appear to fluctuate with time of year probably because water control structures on all outlet tributaries restrict migration.

FAMILY CYPRINONDONTIDAE

18. *Jordanella floridae* Goode and Bean. Flagfish. This species is common in shallow water along the marginal areas of the lake and is most abundant during early spring. It can tolerate low dissolved oxygen.

19. *Cyprinodon variegatus* Lacépède. Sheepshead Minnow. This species was collected in small numbers only on two occasions from one area of the lake. Evidently it inhabits the shallow, marginal area of the lake and is closely associated with spikerush communities and clear water.

20. *Lucania goodei* Jordan. Redfin Killifish. This species is one of the abundant minnows found throughout the littoral zone of the lake. Large numbers collected during the fall months indicate that spawning occurs during the summer.

21. *Fundulus seminolis* Girard. Seminole Killifish. The minnow seems to be limited to the littoral zone of the lake, but occurs in a variety of aquatic plant communities. From the numbers collected, it appears to be commonly associated with spikerush communities and areas of water hyacinths.

22. *Fundulus chrysotus* Holbrook. Golden Topminnow. This species was collected quite frequently during April and May within spikerush communities in shallow, clear water, but was seldom encountered during the fall. Perhaps spawning occurs during the early spring.

FAMILY POECILIIDAE

23. *Poecilia latipinna* (LeSueur). Sailfin Molly. Small numbers of this species were often collected from canals, but it was more abundant in the very shallow, vegetated portion of the lake marsh. It can evidently tolerate or even thrive in water containing very little dissolved oxygen.

24. *Gambusia affinis* (Baird and Girard). Mosquito Fish. These small fish are abundant throughout the littoral zone and canal systems of the lake in practically all types of marginal waters.

25. *Heterandria formosa* Agassiz. Least Killifish. This tiny species is found throughout the littoral zone and canal areas of the lake. Although never found in large numbers, it is common around all kinds of vegetation growing in or at the edge of the water.

FAMILY ATHERINIDAE

26. *Menidia beryllina* (Cope). Tidewater Silversides. This fish is not frequently collected, but is more abundant during the fall months than during spring. It is associated with communities of pondweed in the littoral zone.

27. *Labidesthes sicculus* (Cope). Brook Silversides. Although found throughout the littoral zone and canals, this species occurs abundantly during the spring in spikerush communities in shallow, clear water. This suggests a spring spawning period.

FAMILY CENTRARCHIDAE

28. *Micropterus salmoides* (Lacépède). Largemouth Bass. This desired game fish is abundant and found throughout the lake and canals. The peak spawning period occurs in February and March. Most adults are found within the littoral zone, occurring most frequently within eelgrass and pondweed communities where turbidities are low. The greatest numbers of immature individuals are found in shallow, clear water within the spikerush communities.

29. *Pomoxis nigromaculatus* (LeSueur). Black Crappie. One of the most abundant and sought after game fish of the lake, this species is primarily pelagic. During January, February, March, and April it can be found throughout the littoral zone of the lake. These months are the spawning season of this species. Young individuals evidently move to the open water immediately after reaching a swim-up fry stage. Sexually immature individuals are rarely found within the littoral zone.

30. *Enneacanthus gloriosus* (Holbrook). Bluespotted Sunfish. This small sunfish can be found within communities of pondweed and eelgrass. Although common, these fish are rarely collected in any significant numbers.

31. *Chaenobryttus gulosus* (Cuvier). Warmouth. This sunfish is found throughout the littoral zone of the lake, most abundantly in association with spikerush communities in shallow, clear water. Seasonal collections indicate that spawning occurs during early spring.

32. *Lepomis marginatus* (Holbrook). Dollar Sunfish. This small member of the sunfish family occurs most frequently in the marginal areas of the littoral zone. It seems to occur more frequently during the spring months than during fall, indicating a spring spawning period.

33. *Lepomis punctatus* (Valenciennes). Spotted Sunfish. This species occurs throughout the littoral zone and canal systems of the lake, but is more frequently collected within the canals. Evidently it can utilize better than other centrarchids the canals and littoral

area with much organic sedimentation. Spawning occurs in late spring prior to that of the bluegill.

34. *Lepomis macrochirus* Rafinesque. Bluegill. Found throughout the entire lake and canal systems, this fish is probably the most numerous of centrarchids. Adults are most frequently collected within communities of bulrush, while great numbers of immature individuals are found within dense pondweed and eelgrass communities. Spawning occurs throughout the summer months.

35. *Lepomis microlophus* (Günther). Redear Sunfish. A much desired game fish, this species occurs throughout the lake and canal systems. Adults are found primarily within bulrush communities from late spring to early fall. During the remainder of the year, it seems to prefer the deeper, pelagic area of the lake. Immature individuals are most frequently found within dense communities of pondweed and eelgrass, but occur in eelgrass more frequently than immature bluegills, which are dominant in pondweed. From collections it seems these fish can better utilize the marginal areas of the littoral zone than can the bluegill.

FAMILY PERCIDAE

36. *Etheostoma barratti* (Holbrook). Sealyhead Darter. A rather common but seldom collected species because of its bottom dwelling habits and small size, it is most abundant within the marginal areas of the lake and the canals.

FAMILY BELONIDAE

37. *Strongylura marina* (Walbaum). Atlantic Needlefish. This species is commonly encountered throughout the open area of the lake and within the bulrush communities. A number of gravid females and ripe males have been collected during spring. Individuals of 1-2 inches in total length were frequently collected during summer months, indicating that reproduction occurs within the lake so that this population is not dependent upon their ability to immigrate into the lake.

FAMILY MUGILIDAE

38. *Mugil cephalus* Linnaeus. Striped Mullet. This common salt water species is abundant throughout the open area and most

of the littoral zone from early winter to summer. Spawning does not occur in the lake. During late spring, great numbers can be found in the tributaries leading from the lake to the ocean. Likewise, during late fall this fish can be found migrating into the lake by way of these same tributaries.

FAMILY GOBIIDAE

39. *Microgobius gulosus* (Girard). Clown Goby. This fish was collected on two different occasions from a community of white water lily (*Nymphaea odorata*) and bladderwort (*Utricularia vulgaris*). It was much more abundant during the fall than during spring, an indication that spawning occurs during the summer months.

FAMILY SOLEIDAE

40. *Trinectes maculatus* (Lacépède). Hogchoker. Only one individual was found during the survey. It was captured with a seine in the open portion of the lake.

FAMILY CENTROPOMIDAE

41. *Centropomus undecimalis* (Bloch). Snook. This species was frequently collected in the Clewiston area where navigation channels have been dredged into the lake. The population is evidently entirely dependent upon its ability to immigrate into the lake.

FAMILY ELOPIDAE

42. *Elops saurus* Linnaeus. Ladyfish. On one occasion a school of these fish were sighted in the pelagic area of the lake east of the Caloosahatchee Canal.

43. *Megalops atlantica* Valenciennes. Tarpon. On one occasion in August a tarpon was seen cruising the surface near Rita Island in the southern portion of the lake.

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